

# SEQUENCE LISTING

<110> Mello, Craig C.  
 Tabara, Hiroaki  
 Grishok, Alla  
 Fire, Andrew

<120> RNA INTERFERENCE PATHWAY GENES AS TOOLS FOR TARGETED GENETIC INTERFERENCE

<130> UMY-052DV2

<140> US 09/689,992

<141> 2000-10-13

<150> US 60/193,218

<151> 2000-03-30

<150> US 60/159,776

<151> 1999-10-15

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<212> DNA

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	835					840						845					
Asn	Thr	Arg	Leu	Leu	Arg	Arg	Met	Glu	Lys	Asp	Lys	Pro	Val	Val	Asn		
	850					855					860						
Lys	Asp	Leu	Thr	Pro	Ala	Glu	Thr	Asp	Val	Ala	Val	Ala	Ala	Val	Lys		
865					870					875					880		
Gln	Trp	Glu	Glu	Asp	Met	Lys	Glu	Ser	Lys	Glu	Thr	Gly	Ile	Val	Asn		
				885					890					895			
Pro	Ser	Ser	Gly	Thr	Thr	Val	Asp	Lys	Leu	Ile	Val	Ser	Lys	Tyr	Lys		
			900					905					910				



Phe Asp Phe Phe Leu Ala Ser His His Gly Val Leu Gly Thr Ser Arg  
           915                                  920                                  925  
 Pro Gly His Tyr Thr Val Met Tyr Asp Asp Lys Gly Met Ser Gln Asp  
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 Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala Phe Leu Ser Ala Arg Cys  
 945                                  950                                  955                                  960  
 Arg Lys Pro Ile Ser Leu Pro Val Pro Val His Tyr Ala His Leu Ser  
                                   965                                  970                                  975  
 Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr Tyr Lys Glu His Tyr Ile  
                                   980                                  985                                  990  
 Gly Asp Tyr Ala Gln Pro Arg Thr Arg His Glu Met Glu His Phe Leu  
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 ccttcccgat cggaggataa caaaacgcca agaaacagaa cagattttgga gatgtttctg 120  
 aagaaaactc ccctcatggt actagaagag gctgctaagg ctgtctatca aaagacgcca 180  
 acttggggca ctgtcgaact tcctgaaggc ttcgagatga cgttgattct gaatgaaatt 240  
 actgtaaaag gccaggcaac aagcaagaaa gctgcgagac aaaaggctgc tgttgaatat 300  
 ttacgcaagg ttgtggagaa aggaaagcac gaaatctttt tcattcctgg aacaacccaa 360  
 gaagaagctc tttcgaatat tgatcaaata tcggataagg ctgaggaatt gaaacgatca 420  
 acttcagatg ctgttcagga taacgataac gatgattcga ttcctacaag tgctgaattt 480  
 ccacctggta tttcgccaac cgagaattgg gtcggaagt tgcaggaaaa atctcaaaaa 540  
 agcaagctgc aagccccaat ctatgaagat tccaagaatg agagaaccga gcgtttcttg 600  
 gttatatgca cgatgtgcaa tcaaaaaacc agaggaaatc gaagtaagaa gaaggacgca 660  
 aagaatcttg cagcatggtt gatgtggaaa gcgttggaag acggtatcga atctctggaa 720  
 tcatatgata tggttgatgt gattgaaaat ttggaagaag ctgaacattt actcgaaatt 780  
 caggatcaag catccaagat taaagacaag cattccgcac tgattgatat actctcggac 840  
 aagaaaagat tttcagacta cagcatggat ttcaacgtat tatcagtga cacaatggga 900  
 atacatcagg tgctattgga aatctcgttc cggcgtctag tttctccaga ccccgacgat 960  
 ttggaaatgg gagcagaaca caccagact gaagaaatta tgaaggctac tgccgagaag 1020  
 gaaaagctac ggaagaagaa tatgccagat tccgggccgc tagtggttgc tggacatggt 1080  
 tcatcggcgg aagaggctaa acagtgtgct tgtaaatcgg cgattatcca tttcaacacc 1140  
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           20                                  25                                  30  
 Arg Thr Asp Leu Glu Met Phe Leu Lys Lys Thr Pro Leu Met Val Leu  
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 Glu Glu Ala Ala Lys Ala Val Tyr Gln Lys Thr Pro Thr Trp Gly Thr

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Val	Glu	Leu	Pro	Glu	Gly	Phe	Glu	Met	Thr	Leu	Ile	Leu	Asn	Glu	Ile				
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Thr	Val	Lys	Gly	Gln	Ala	Thr	Ser	Lys	Lys	Ala	Ala	Arg	Gln	Lys	Ala				
	85	90												95					
Ala	Val	Glu	Tyr	Leu	Arg	Lys	Val	Val	Glu	Lys	Gly	Lys	His	Glu	Ile				
	100	105											110						
Phe	Phe	Ile	Pro	Gly	Thr	Thr	Lys	Glu	Glu	Ala	Leu	Ser	Asn	Ile	Asp				
	115	120										125							
Gln	Ile	Ser	Asp	Lys	Ala	Glu	Glu	Leu	Lys	Arg	Ser	Thr	Ser	Asp	Ala				
	130	135								140									
Val	Gln	Asp	Asn	Asp	Asn	Asp	Asp	Ser	Ile	Pro	Thr	Ser	Ala	Glu	Phe				
145		150							155						160				
Pro	Pro	Gly	Ile	Ser	Pro	Thr	Glu	Asn	Trp	Val	Gly	Lys	Leu	Gln	Glu				
	165	170							175										
Lys	Ser	Gln	Lys	Ser	Lys	Leu	Gln	Ala	Pro	Ile	Tyr	Glu	Asp	Ser	Lys				
	180	185							190										
Asn	Glu	Arg	Thr	Glu	Arg	Phe	Leu	Val	Ile	Cys	Thr	Met	Cys	Asn	Gln				
	195	200							205										
Lys	Thr	Arg	Gly	Ile	Arg	Ser	Lys	Lys	Lys	Asp	Ala	Lys	Asn	Leu	Ala				
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Ala	Trp	Leu	Met	Trp	Lys	Ala	Leu	Glu	Asp	Gly	Ile	Glu	Ser	Leu	Glu				
225		230							235						240				
Ser	Tyr	Asp	Met	Val	Asp	Val	Ile	Glu	Asn	Leu	Glu	Glu	Ala	Glu	His				
	245	250							255						260				
Leu	Leu	Glu	Ile	Gln	Asp	Gln	Ala	Ser	Lys	Ile	Lys	Asp	Lys	His	Ser				
	260	265							270										
Ala	Leu	Ile	Asp	Ile	Leu	Ser	Asp	Lys	Lys	Arg	Phe	Ser	Asp	Tyr	Ser				
	275	280							285										
Met	Asp	Phe	Asn	Val	Leu	Ser	Val	Ser	Thr	Met	Gly	Ile	His	Gln	Val				
	290	295							300										
Leu	Leu	Glu	Ile	Ser	Phe	Arg	Arg	Leu	Val	Ser	Pro	Asp	Pro	Asp	Asp				
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Leu	Glu	Met	Gly	Ala	Glu	His	Thr	Gln	Thr	Glu	Glu	Ile	Met	Lys	Ala				
	325	330							335										
Thr	Ala	Glu	Lys	Glu	Lys	Leu	Arg	Lys	Lys	Asn	Met	Pro	Asp	Ser	Gly				
	340	345							350										
Pro	Leu	Val	Phe	Ala	Gly	His	Gly	Ser	Ser	Ala	Glu	Glu	Ala	Lys	Gln				
	355	360							365										
Cys	Ala	Cys	Lys	Ser	Ala	Ile	His	Phe	Asn	Thr	Tyr	Asp	Phe	Thr					
	370	375							380										
Asp	Xaa	Lys	Tyr	Tyr	Cys	Val	Phe	Leu	Lys	Asn	Glu	Ala	Ser	Glu	Xaa				
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Leu	Xaa	Lys	Lys	Lys	Lys	Lys													
	405																		

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 Gly Lys Arg Ala Asp Cys Pro Gln Glu Ala Val Gln Ile Leu Asp Ile  
 35 40 45  
 Val Leu Arg Glu Leu Ser Val Lys Arg Phe Cys Pro Val Gly Arg Ser  
 50 55 60  
 Phe Phe Ser Pro Asp Ile Lys Thr Pro Gln Arg Leu Gly Glu Gly Leu

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Glu	Ser	Trp	Cys	Gly	Phe	Tyr	Gln	Ser	Ile	Arg	Pro	Thr	Gln	Met	Gly
				85					90					95	
Leu	Ser	Leu	Asn	Ile	Asp	Met	Ala	Ser	Ala	Ala	Phe	Ile	Glu	Pro	Leu
			100					105					110		
Pro	Val	Ile	Glu	Phe	Val	Ala	Gln	Leu	Leu	Gly	Lys	Asp	Val	Leu	Ser
		115					120					125			
Lys	Pro	Leu	Ser	Asp	Ser	Asp	Arg	Val	Lys	Ile	Lys	Lys	Gly	Leu	Arg
	130					135					140				
Gly	Val	Lys	Val	Glu	Val	Thr	His	Arg	Ala	Asn	Val	Arg	Arg	Lys	Tyr
145					150					155					160
Arg	Val	Ala	Gly	Leu	Thr	Thr	Gln	Pro	Thr	Arg	Glu	Leu	Met	Phe	Pro
				165					170					175	
Val	Asp	Glu	Asn	Cys	Thr	Met	Lys	Ser	Val	Ile	Glu	Tyr	Phe	Gln	Glu
			180					185					190		
Met	Tyr	Gly	Phe	Thr	Ile	Gln	His	Thr	His	Leu	Pro	Cys	Leu	Gln	Val
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Gly	Asn	Gln	Lys	Lys	Ala	Ser	Tyr	Leu	Pro	Met	Glu	Ala	Cys	Lys	Ile
	210					215					220				
Val	Glu	Gly	Gln	Arg	Tyr	Thr	Lys	Arg	Leu	Asn	Glu	Lys	Gln	Ile	Thr
225					230					235					240
Ala	Leu	Leu	Lys	Val	Thr	Cys	Gln	Arg	Ala	Glu	Gly	Gln	Arg	Asn	Asp
				245					250					255	
Ile	Leu	Arg	Thr	Val	Gln	His	Asn	Ala	Tyr	Asp	Gln	Asp	Pro	Tyr	Ala
			260					265					270		
Lys	Glu	Phe	Gly	Met	Asn	Ile	Ser	Glu	Lys	Leu	Ala	Ser	Val	Glu	Ala
		275					280					285			
Arg	Ile	Leu	Pro	Ala	Pro	Trp	Leu	Lys	Tyr	His	Glu	Asn	Gly	Lys	Glu
	290					295					300				
Lys	Asp	Cys	Leu	Pro	Gln	Val	Gly	Gln	Trp	Asn	Met	Met	Asn	Lys	Lys
305					310					315					320
Met	Ile	Asn	Gly	Met	Thr	Val	Ser	Arg	Trp	Ala	Cys	Val	Asn	Phe	Ser
				325					330					335	
Arg	Ser	Val	Gln	Glu	Asn	Val	Ala	Arg	Gly	Phe	Cys	Asn	Glu	Leu	Gly
			340					345					350		
Gln	Met	Cys	Glu	Val	Ser	Gly	Met	Glu	Phe	Asn	Pro	Glu	Pro	Val	Ile
		355					360					365			
Pro	Ile	Tyr	Ser	Ala	Arg	Pro	Asp	Gln	Val	Glu	Lys	Ala	Leu	Lys	His
	370					375					380				
Val	Tyr	His	Thr	Ser	Met	Asn	Lys	Thr	Lys	Gly	Lys	Glu	Leu	Glu	Leu
385					390					395					400
Leu	Leu	Ala	Ile	Leu	Pro	Asp	Asn	Asn	Gly	Ser	Leu	Tyr	Gly	Asp	Leu
				405					410					415	
Lys	Arg	Ile	Cys	Glu	Thr	Glu	Leu	Gly	Leu	Ile	Ser	Gln	Cys	Cys	Leu
			420					425					430		
Thr	Lys	His	Val	Phe	Lys	Ile	Ser	Lys	Gln	Tyr	Leu	Ala	Asp	Val	Ser
		435					440					445			
Leu	Lys	Ile	Asn	Val	Lys	Met	Gly	Gly	Arg	Asn	Thr	Val	Leu	Val	Asp
	450					455					460				
Ala	Ile	Ser	Cys	Arg	Ile	Pro	Leu	Val	Ser	Asp	Ile	Pro	Thr	Ile	Ile
465					470					475					480
Phe	Gly	Ala	Asp	Val	Thr	His	Pro	Glu	Asn	Gly	Glu	Glu	Ser	Ser	Pro
			485						490					495	
Ser	Ile	Ala	Ala	Val	Val	Ala	Ser	Gln	Asp	Trp	Pro	Glu	Val	Thr	Lys
			500					505					510		
Tyr	Ala	Gly	Leu	Val	Cys	Ala	Gln	Ala	His	Arg	Gln	Glu	Leu	Ile	Gln
	515						520					525			
Asp	Leu	Tyr	Lys	Thr	Trp	Gln	Asp	Pro	Val	Arg	Gly	Thr	Val	Ser	Gly
	530					535					540				
Gly	Met	Ile	Arg	Asp	Leu	Leu	Ile	Ser	Phe	Arg	Lys	Ala	Thr	Gly	Gln
545					550					555					560

Lys	Pro	Leu	Arg	Ile	Ile	Phe	Tyr	Arg	Asp	Gly	Val	Ser	Glu	Gly	Gln
				565					570					575	
Phe	Tyr	Gln	Val	Leu	Leu	Tyr	Glu	Leu	Asp	Ala	Ile	Arg	Lys	Ala	Cys
			580					585					590		
Ala	Ser	Leu	Glu	Pro	Asn	Tyr	Gln	Pro	Pro	Val	Thr	Phe	Ile	Val	Val
		595					600					605			
Gln	Lys	Arg	His	His	Thr	Arg	Leu	Phe	Ala	Asn	Asn	His	Arg	Asp	Lys
	610					615					620				
Asn	Ser	Thr	Asp	Arg	Ser	Gly	Asn	Ile	Leu	Pro	Gly	Thr	Val	Val	Asp
625					630					635					640
Thr	Lys	Ile	Cys	His	Pro	Thr	Glu	Phe	Asp	Phe	Tyr	Leu	Cys	Ser	His
				645					650					655	
Ala	Gly	Ile	Gln	Gly	Thr	Ser	Arg	Pro	Ala	His	Tyr	His	Val	Leu	Trp
			660					665					670		
Asp	Glu	Asn	Asn	Phe	Thr	Ala	Asp	Gly	Ile	Gln	Ser	Leu	Thr	Asn	Asn
		675					680					685			
Leu	Cys	Tyr	Thr	Tyr	Ala	Arg	Cys	Thr	Arg	Ser	Val	Ser	Ile	Val	Pro
	690					695					700				
Pro	Ala	Tyr	Tyr	Ala	His	Leu	Ala	Ala	Phe	Arg	Ala	Arg	Phe	Tyr	Leu
705					710					715					720
Glu	Pro	Glu	Ile	Met	Gln	Asp	Asn	Gly	Ser	Pro	Gly	Lys	Lys	Asn	Thr
				725					730					735	
Lys	Thr	Thr	Thr	Val	Gly	Asp	Val	Gly	Val	Lys	Pro	Leu	Pro	Ala	Leu
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Lys	Glu	Asn	Val	Lys	Arg	Val	Met	Phe	Tyr	Cys					
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<211> 678

<212> PRT

<213> *Drosophila melanogaster*

<400> 7

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Gln	Ser	Thr	Asp	Ala	Glu	Gln	Phe	Gln	Val	Leu	Asn	Leu	Ile	Leu	Arg
			20					25					30		
Arg	Ala	Met	Glu	Gly	Leu	Asp	Leu	Lys	Leu	Val	Ser	Arg	Tyr	Tyr	Tyr
		35					40					45			
Asp	Pro	Gln	Ala	Lys	Ile	Asn	Leu	Glu	Asn	Phe	Arg	Met	Gln	Leu	Trp
	50					55					60				
Pro	Gly	Tyr	Gln	Thr	Ser	Ile	Arg	Gln	His	Glu	Asn	Asp	Ile	Leu	Leu
	65				70					75					80
Cys	Ser	Glu	Ile	Cys	His	Lys	Val	Met	Arg	Thr	Glu	Thr	Leu	Tyr	Asn
				85					90					95	
Ile	Leu	Ser	Asp	Ala	Ile	Arg	Asp	Ser	Asp	Asp	Tyr	Gln	Ser	Thr	Phe
			100					105					110		
Lys	Arg	Ala	Val	Met	Gly	Met	Val	Ile	Leu	Thr	Asp	Tyr	Asn	Asn	Lys
		115					120					125			
Thr	Tyr	Arg	Ile	Asp	Asp	Val	Asp	Phe	Gln	Ser	Thr	Pro	Leu	Cys	Lys
		130				135					140				
Phe	Lys	Thr	Asn	Asp	Gly	Glu	Ile	Ser	Tyr	Val	Asp	Tyr	Tyr	Lys	Lys
	145				150					155					160
Arg	Tyr	Asn	Ile	Ile	Ile	Arg	Asp	Leu	Lys	Gln	Pro	Leu	Val	Met	Ser
				165					170					175	
Arg	Pro	Thr	Asp	Lys	Asn	Ile	Arg	Gly	Gly	Asn	Asp	Gln	Ala	Ile	Met
			180					185					190		
Ile	Ile	Pro	Glu	Leu	Ala	Arg	Ala	Thr	Gly	Met	Thr	Asp	Ala	Met	Arg
		195					200					205			
Ala	Asp	Phe	Arg	Thr	Leu	Arg	Ala	Met	Ser	Glu	His	Thr	Arg	Leu	Asn
		210				215					220				

Pro	Asp	Arg	Arg	Ile	Glu	Arg	Leu	Arg	Met	Phe	Asn	Lys	Arg	Leu	Lys
225					230					235					240
Ser	Cys	Lys	Gln	Ser	Val	Glu	Thr	Leu	Lys	Ser	Trp	Asn	Ile	Glu	Leu
				245					250					255	
Asp	Ser	Ala	Leu	Val	Glu	Ile	Pro	Ala	Arg	Val	Leu	Pro	Pro	Glu	Lys
			260					265						270	
Ile	Leu	Phe	Gly	Asn	Gln	Lys	Ile	Phe	Val	Cys	Asp	Ala	Arg	Ala	Asp
		275					280					285			
Trp	Thr	Asn	Glu	Phe	Arg	Thr	Cys	Ser	Met	Phe	Lys	Asn	Val	His	Ile
	290					295					300				
Asn	Arg	Trp	Tyr	Val	Ile	Thr	Pro	Ser	Arg	Asn	Leu	Arg	Glu	Thr	Gln
305					310					315					320
Glu	Phe	Val	Gln	Met	Cys	Ile	Arg	Thr	Ala	Ser	Ser	Met	Lys	Met	Asn
				325					330					335	
Ile	Cys	Asn	Pro	Ile	Tyr	Glu	Glu	Ile	Pro	Asp	Asp	Arg	Asn	Gly	Thr
			340					345					350		
Tyr	Ser	Gln	Ala	Ile	Asp	Asn	Ala	Ala	Ala	Asn	Asp	Pro	Gln	Ile	Val
		355					360					365			
Met	Val	Val	Met	Arg	Ser	Pro	Asn	Glu	Glu	Lys	Tyr	Ser	Cys	Ile	Lys
	370					375					380				
Lys	Arg	Thr	Cys	Val	Asp	Arg	Pro	Val	Pro	Ser	Gln	Val	Val	Thr	Leu
385					390					395					400
Lys	Val	Ile	Ala	Pro	Arg	Gln	Gln	Lys	Pro	Thr	Gly	Leu	Met	Ser	Ile
			405						410					415	
Ala	Thr	Lys	Val	Val	Ile	Gln	Met	Asn	Ala	Lys	Leu	Met	Gly	Ala	Pro
			420					425					430		
Trp	Gln	Val	Val	Ile	Pro	Leu	His	Gly	Leu	Met	Thr	Val	Gly	Phe	Asp
	435					440					445				
Val	Cys	His	Ser	Pro	Lys	Asn	Lys	Asn	Lys	Ser	Tyr	Gly	Ala	Phe	Val
	450					455					460				
Ala	Thr	Met	Asp	Gln	Lys	Glu	Ser	Phe	Arg	Tyr	Phe	Ser	Thr	Val	Asn
465					470					475					480
Glu	His	Ile	Lys	Gly	Gln	Glu	Leu	Ser	Glu	Gln	Met	Ser	Val	Asn	Met
				485					490					495	
Ala	Cys	Ala	Leu	Arg	Ser	Tyr	Gln	Glu	Gln	His	Arg	Ser	Leu	Pro	Glu
			500					505					510		
Arg	Ile	Leu	Phe	Phe	Arg	Asp	Gly	Val	Gly	Asp	Gly	Gln	Leu	Tyr	Gln
	515						520					525			
Val	Val	Asn	Ser	Glu	Val	Asn	Thr	Leu	Lys	Asp	Arg	Leu	Asp	Glu	Ile
	530					535					540				
Tyr	Lys	Ser	Ala	Gly	Lys	Gln	Glu	Gly	Cys	Arg	Met	Thr	Phe	Ile	Ile
545					550					555					560
Val	Ser	Lys	Arg	Ile	Asn	Ser	Arg	Tyr	Phe	Thr	Gly	His	Arg	Asn	Pro
				565					570					575	
Val	Pro	Gly	Thr	Val	Val	Asp	Asp	Val	Ile	Thr	Leu	Pro	Glu	Arg	Tyr
			580					585					590		
Asp	Phe	Phe	Leu	Val	Ser	Gln	Ala	Val	Arg	Ile	Gly	Thr	Val	Ser	Pro
	595						600					605			
Thr	Ser	Tyr	Asn	Val	Ile	Ser	Asp	Asn	Met	Gly	Leu	Asn	Ala	Asp	Lys
	610					615					620				
Leu	Gln	Met	Leu	Ser	Tyr	Lys	Met	Thr	His	Met	Tyr	Tyr	Asn	Tyr	Ser
625					630					635					640
Gly	Thr	Ile	Arg	Val	Pro	Ala	Val	Cys	His	Tyr	Ala	His	Lys	Leu	Ala
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Phe	Leu	Val	Ala	Glu	Ser	Ile	Asn	Arg	Ala	Pro	Ser	Ala	Gly	Leu	Gln
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<211> 69

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<220>  
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 41, 44, 45, 46, 47, 49, 51, 55, 56, 59, 60, 63, 64,  
 67, 68

<223> Xaa = Any Amino Acid

<221> VARIANT  
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 20 25 30  
 Xaa Phe Xaa Xaa Xaa Val Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Gly  
 35 40 45  
 Xaa Gly Xaa Ser Lys Lys Xaa Xaa Ala Lys Xaa Xaa Ala Ala Xaa Xaa  
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 Ala Leu Xaa Xaa Leu  
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<210> 9  
 <211> 766  
 <212> PRT  
 <213> Caenorhabditis elegans

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 35 40 45  
 Pro Ser Leu Lys Tyr Thr Pro Val Gly Arg Ser Phe Phe Ser Pro Pro  
 50 55 60  
 Val Pro Asn Ala Ser Gly Val Met Ala Gly Ser Cys Pro Pro Gln Ala  
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 Ser Gly Ala Val Ala Gly Gly Ala His Ser Ala Gly Gln Tyr His Ala  
 85 90 95  
 Glu Ser Lys Leu Gly Gly Gly Arg Glu Val Trp Phe Gly Phe His Gln  
 100 105 110  
 Ser Val Arg Pro Ser Gln Trp Lys Met Met Leu Asn Ile Asp Val Ser  
 115 120 125  
 Ala Thr Ala Phe Tyr Arg Ser Met Pro Val Ile Glu Phe Ile Ala Glu  
 130 135 140  
 Val Leu Glu Leu Pro Val Gln Ala Leu Ala Glu Arg Arg Ala Leu Ser  
 145 150 155 160  
 Asp Ala Gln Arg Val Lys Phe Thr Lys Glu Ile Arg Gly Leu Lys Ile  
 165 170 175  
 Glu Ile Thr His Cys Gly Gln Met Arg Arg Lys Tyr Arg Val Cys Asn  
 180 185 190

15

		675					680					685					
Gln	Gln	Leu	Thr	Tyr	Gln	Met	Cys	His	Thr	Tyr	Val	Arg	Cys	Thr	Arg		
	690					695					700						
Ser	Val	Ser	Ile	Pro	Ala	Pro	Ala	Tyr	Tyr	Ala	His	Leu	Val	Ala	Phe		
705					710					715					720		
Arg	Ala	Arg	Tyr	His	Leu	Val	Asp	Arg	Glu	His	Asp	Ser	Gly	Glu	Gly		
				725					730					735			
Ser	Gln	Pro	Ser	Gly	Thr	Ser	Glu	Asp	Thr	Thr	Leu	Ser	Asn	Met	Ala		
			740					745					750				
Arg	Ala	Val	Gln	Val	Ile	Leu	Ala	Phe	Asn	Leu	Val	Ser	Ile				
		755					760					765					

<210> 10  
 <211> 737  
 <212> PRT  
 <213> Oryctolagus cuniculus

<400> 10

Gly	Lys	Asp	Arg	Ile	Phe	Lys	Val	Ser	Ile	Lys	Trp	Val	Ser	Cys	Val		
1				5					10					15			
Ser	Leu	Gln	Ala	Leu	His	Asp	Ala	Leu	Ser	Gly	Arg	Leu	Pro	Ser	Val		
			20					25					30				
Pro	Phe	Glu	Thr	Ile	Gln	Ala	Leu	Asp	Val	Val	Met	Arg	His	Leu	Pro		
		35					40					45					
Ser	Met	Arg	Tyr	Thr	Pro	Val	Gly	Arg	Ser	Phe	Phe	Thr	Ala	Ser	Glu		
	50					55					60						
Gly	Cys	Ser	Asn	Pro	Leu	Gly	Gly	Gly	Arg	Glu	Val	Trp	Phe	Gly	Phe		
65				70					75					80			
His	Gln	Ser	Val	Arg	Pro	Ser	Leu	Trp	Lys	Met	Met	Leu	Asn	Ile	Asp		
				85					90					95			
Val	Ser	Ala	Thr	Ala	Phe	Tyr	Lys	Ala	Gln	Pro	Val	Ile	Glu	Phe	Val		
			100					105					110				
Cys	Glu	Val	Leu	Asp	Phe	Lys	Ser	Ile	Glu	Glu	Gln	Gln	Lys	Pro	Leu		
		115					120					125					
Thr	Asp	Ser	Gln	Arg	Val	Lys	Phe	Thr	Lys	Glu	Ile	Lys	Gly	Leu	Lys		
	130					135					140						
Val	Glu	Ile	Thr	His	Cys	Gly	Gln	Met	Lys	Arg	Lys	Tyr	Arg	Val	Cys		
145					150				155						160		
Asn	Val	Thr	Arg	Arg	Pro	Ala	Ser	His	Gln	Thr	Phe	Pro	Leu	Gln	Gln		
				165					170					175			
Glu	Ser	Gly	Gln	Thr	Val	Glu	Cys	Thr	Val	Ala	Gln	Tyr	Phe	Lys	Asp		
			180					185					190				
Arg	His	Lys	Leu	Val	Leu	Arg	Tyr	Pro	His	Leu	Pro	Cys	Leu	Gln	Val		
		195				200						205					
Gly	Gln	Glu	Gln	Lys	His	Thr	Tyr	Leu	Pro	Leu	Glu	Val	Cys	Asn	Ile		
	210					215					220						
Val	Ala	Gly	Gln	Arg	Cys	Ile	Lys	Lys	Leu	Thr	Asp	Asn	Gln	Thr	Ser		
225					230					235					240		
Thr	Met	Ile	Arg	Ala	Thr	Ala	Arg	Ser	Ala	Pro	Asp	Arg	Gln	Glu	Glu		
				245					250					255			
Ile	Ser	Lys	Leu	Met	Arg	Ser	Ala	Ser	Phe	Asn	Thr	Asp	Pro	Tyr	Val		
			260					265					270				
Arg	Glu	Phe	Gly	Ile	Met	Val	Lys	Asp	Glu	Met	Thr	Asp	Val	Thr	Gly		
		275					280					285					
Arg	Val	Leu	Gln	Pro	Pro	Ser	Ile	Leu	Tyr	Gly	Gly	Arg	Asn	Lys	Ala		
	290					295					300						
Ile	Ala	Thr	Pro	Val	Gln	Gly	Val	Trp	Asp	Met	Arg	Asn	Lys	Gln	Phe		
305					310					315					320		
His	Thr	Gly	Ile	Glu	Ile	Lys	Val	Trp	Ala	Ile	Ala	Cys	Phe	Ala	Pro		
				325					330					335			
Gln	Arg	Gln	Cys	Thr	Glu	Val	His	Leu	Lys	Ser	Phe	Thr	Glu	Gln	Leu		



			340					345					350				
Arg	Lys	Ile	Ser	Arg	Asp	Ala	Gly	Met	Pro	Ile	Gln	Gly	Gln	Pro	Cys		
		355					360					365					
Phe	Cys	Lys	Tyr	Ala	Gln	Gly	Ala	Asp	Ser	Val	Gly	Pro	Met	Phe	Arg		
		370				375					380						
His	Leu	Lys	Asn	Thr	Tyr	Ala	Gly	Leu	Gln	Leu	Val	Val	Val	Ile	Leu		
385					390					395					400		
Pro	Gly	Lys	Thr	Pro	Val	Tyr	Ala	Glu	Val	Lys	Arg	Val	Gly	Asp	Thr		
				405					410					415			
Val	Leu	Gly	Met	Ala	Thr	Gln	Cys	Val	Gln	Met	Lys	Asn	Val	Gln	Arg		
			420					425					430				
Thr	Thr	Pro	Gln	Thr	Leu	Ser	Asn	Leu	Cys	Leu	Lys	Ile	Asn	Val	Lys		
		435					440					445					
Leu	Gly	Gly	Val	Asn	Asn	Ile	Leu	Leu	Pro	Gln	Gly	Arg	Pro	Pro	Val		
	450					455				460							
Phe	Gln	Gln	Pro	Val	Ile	Phe	Leu	Gly	Ala	Asp	Val	Thr	His	Pro	Pro		
465					470					475					480		
Ala	Gly	Asp	Gly	Lys	Lys	Pro	Ser	Ile	Ala	Ala	Val	Val	Gly	Ser	Met		
				485					490					495			
Asp	Ala	His	Pro	Asn	Arg	Tyr	Cys	Ala	Thr	Val	Arg	Val	Gln	Gln	His		
			500					505					510				
Arg	Gln	Glu	Ile	Ile	Gln	Asp	Leu	Ala	Ala	Met	Val	Arg	Glu	Leu	Leu		
		515					520						525				
Ile	Gln	Phe	Tyr	Lys	Ser	Thr	Arg	Phe	Lys	Pro	Thr	Arg	Ile	Ile	Phe		
	530					535					540						
Tyr	Arg	Asp	Gly	Val	Ser	Glu	Gly	Gln	Phe	Gln	Gln	Val	Leu	His	His		
545					550					555					560		
Glu	Leu	Leu	Ala	Ile	Arg	Glu	Ala	Cys	Ile	Lys	Leu	Glu	Lys	Asp	Tyr		
				565					570					575			
Gln	Pro	Gly	Ile	Thr	Phe	Ile	Val	Val	Gln	Lys	Arg	His	His	Thr	Arg		
			580					585					590				
Leu	Phe	Cys	Thr	Asp	Lys	Asn	Glu	Arg	Val	Gly	Lys	Ser	Gly	Asn	Ile		
		595					600						605				
Pro	Ala	Gly	Thr	Thr	Val	Asp	Thr	Lys	Ile	Thr	His	Pro	Thr	Glu	Phe		
						615					620						
Asp	Phe	Tyr	Leu	Cys	Ser	His	Ala	Gly	Ile	Gln	Gly	Thr	Ser	Arg	Pro		
625					630					635					640		
Ser	His	Tyr	His	Val	Leu	Trp	Asp	Asp	Asn	Arg	Phe	Ser	Ser	Asp	Glu		
				645					650					655			
Leu	Gln	Ile	Leu	Thr	Tyr	Gln	Leu	Cys	His	Thr	Tyr	Val	Arg	Cys	Thr		
			660					665					670				
Arg	Ser	Val	Ser	Ile	Pro	Ala	Pro	Ala	Tyr	Tyr	Ala	His	Leu	Val	Ala		
			675				680						685				
Phe	Arg	Ala	Arg	Tyr	His	Leu	Val	Asp	Lys	Glu	His	Asp	Ser	Ala	Glu		
	690					695					700						
Gly	Ser	His	Thr	Ser	Gly	Gln	Ser	Asn	Gly	Arg	Asp	His	Gln	Ala	Leu		
705					710					715					720		
Ala	Lys	Ala	Val	Gln	Val	His	Gln	Asp	Thr	Leu	Arg	Thr	Met	Tyr	Phe		
				725					730					735			

Ala

<210> 11  
 <211> 66  
 <212> PRT  
 <213> *Xenopus laevis*

<400> 11  
 Pro Val Gly Ser Leu Gln Glu Leu Ala Val Gln Lys Gly Trp Arg Leu  
 1 5 10 15  
 Pro Glu Tyr Thr Val Ala Gln Glu Ser Gly Pro Pro His Lys Arg Glu

			20						25				30				
Phe	Thr	Ile	Thr	Cys	Arg	Val	Glu	Thr	Phe	Val	Glu	Thr	Gly	Ser	Gly		
		35					40					45					
Thr	Ser	Lys	Gln	Val	Ala	Lys	Arg	Val	Ala	Ala	Glu	Lys	Leu	Leu	Thr		
	50					55					60						
Lys	Phe																
65																	

<210> 12  
 <211> 66  
 <212> PRT  
 <213> Homo sapiens

Phe	Met	Glu	Glu	Leu	Asn	Thr	Tyr	Arg	Gln	Lys	Gln	Gly	Val	Val	Leu		
1				5					10					15			
Lys	Tyr	Gln	Glu	Leu	Pro	Asn	Ser	Gly	Pro	Pro	His	Asp	Arg	Arg	Phe		
		20						25					30				
Thr	Phe	Gln	Val	Ile	Ile	Asp	Gly	Arg	Glu	Phe	Pro	Glu	Gly	Glu	Gly		
		35					40					45					
Arg	Ser	Lys	Lys	Glu	Ala	Lys	Asn	Ala	Ala	Ala	Lys	Leu	Ala	Val	Glu		
	50					55					60						
Ile	Leu																
65																	

<210> 13  
 <211> 818  
 <212> PRT  
 <213> Caenorhabditis elegans

Val	Asn	Glu	Glu	Ile	Lys	Val	Gln	Phe	Ala	Lys	Asn	Phe	Val	Tyr	Asp		
1				5					10					15			
Asn	Asn	Ser	Ile	Leu	Arg	Val	Pro	Glu	Ser	Phe	His	Asp	Pro	Asn	Arg		
		20						25					30				
Phe	Glu	Gln	Ser	Leu	Glu	Val	Ala	Pro	Arg	Ile	Glu	Ala	Trp	Phe	Gly		
		35					40					45					
Ile	Tyr	Ile	Gly	Ile	Lys	Glu	Leu	Phe	Asp	Gly	Glu	Pro	Val	Leu	Asn		
	50				55					60							
Phe	Ala	Ile	Val	Asp	Lys	Leu	Phe	Tyr	Asn	Ala	Pro	Lys	Met	Ser	Leu		
65				70					75						80		
Leu	Asp	Tyr	Leu	Leu	Leu	Ile	Val	Asp	Pro	Gln	Ser	Cys	Asn	Asp	Asp		
			85					90					95				
Val	Arg	Lys	Asp	Leu	Lys	Thr	Lys	Leu	Met	Ala	Gly	Lys	Met	Thr	Ile		
		100						105					110				
Arg	Gln	Ala	Ala	Arg	Pro	Arg	Ile	Arg	Gln	Leu	Leu	Glu	Asn	Leu	Lys		
		115					120					125					
Leu	Lys	Cys	Ala	Glu	Val	Trp	Asp	Asn	Glu	Met	Ser	Arg	Leu	Thr	Glu		
	130					135				140							
Arg	His	Leu	Thr	Phe	Leu	Asp	Leu	Cys	Glu	Glu	Asn	Ser	Leu	Val	Tyr		
145					150				155						160		
Lys	Val	Thr	Gly	Lys	Ser	Asp	Arg	Gly	Arg	Asn	Ala	Lys	Lys	Tyr	Asp		
			165					170						175			
Thr	Thr	Leu	Phe	Lys	Ile	Tyr	Glu	Glu	Asn	Lys	Lys	Phe	Ile	Glu	Phe		
		180					185						190				
Pro	His	Leu	Pro	Leu	Val	Lys	Val	Lys	Ser	Gly	Ala	Lys	Glu	Tyr	Ala		
		195				200						205					
Val	Pro	Met	Glu	His	Leu	Glu	Val	His	Glu	Lys	Pro	Gln	Arg	Tyr	Lys		
	210				215						220						
Asn	Arg	Ile	Asp	Leu	Val	Met	Gln	Asp	Lys	Phe	Leu	Lys	Arg	Ala	Thr		
225					230					235					240		

Arg	Lys	Pro	His	Asp	Tyr	Lys	Glu	Asn	Thr	Leu	Lys	Met	Leu	Lys	Glu	245	250	255
Leu	Asp	Phe	Ser	Ser	Glu	Glu	Leu	Asn	Phe	Val	Glu	Arg	Phe	Gly	Leu	260	265	270
Cys	Ser	Lys	Leu	Gln	Met	Ile	Glu	Cys	Pro	Gly	Lys	Val	Leu	Lys	Glu	275	280	285
Pro	Met	Leu	Val	Asn	Ser	Val	Asn	Glu	Gln	Ile	Lys	Met	Thr	Pro	Val	290	295	300
Ile	Arg	Gly	Phe	Gln	Glu	Lys	Gln	Leu	Asn	Val	Val	Pro	Glu	Lys	Glu	305	310	315
Leu	Cys	Cys	Ala	Val	Phe	Val	Val	Asn	Glu	Thr	Ala	Gly	Asn	Pro	Cys	325	330	335
Leu	Glu	Glu	Asn	Asp	Val	Val	Lys	Phe	Tyr	Thr	Glu	Leu	Ile	Gly	Gly	340	345	350
Cys	Lys	Phe	Arg	Gly	Ile	Arg	Ile	Gly	Ala	Asn	Glu	Asn	Arg	Gly	Ala	355	360	365
Gln	Ser	Ile	Met	Tyr	Asp	Ala	Thr	Lys	Asn	Glu	Tyr	Ala	Phe	Tyr	Lys	370	375	380
Asn	Cys	Thr	Leu	Asn	Thr	Gly	Ile	Gly	Arg	Phe	Glu	Ile	Ala	Ala	Thr	385	390	395
Glu	Ala	Lys	Asn	Met	Phe	Glu	Arg	Leu	Pro	Asp	Lys	Glu	Gln	Lys	Val	405	410	415
Leu	Met	Phe	Ile	Ile	Ile	Ser	Lys	Arg	Gln	Leu	Asn	Ala	Tyr	Gly	Phe	420	425	430
Val	Lys	His	Tyr	Cys	Asp	His	Thr	Ile	Gly	Val	Ala	Asn	Gln	His	Ile	435	440	445
Thr	Ser	Glu	Thr	Val	Thr	Lys	Ala	Leu	Ala	Ser	Leu	Arg	His	Glu	Lys	450	455	460
Gly	Ser	Lys	Arg	Ile	Phe	Tyr	Gln	Ile	Ala	Leu	Lys	Ile	Asn	Ala	Lys	465	470	475
Leu	Gly	Gly	Ile	Asn	Gln	Glu	Leu	Asp	Trp	Ser	Glu	Ile	Ala	Glu	Ile	485	490	495
Ser	Pro	Glu	Glu	Lys	Glu	Arg	Arg	Lys	Thr	Met	Pro	Leu	Thr	Met	Tyr	500	505	510
Val	Gly	Ile	Asp	Val	Thr	His	Pro	Thr	Ser	Tyr	Ser	Gly	Ile	Asp	Tyr	515	520	525
Ser	Ile	Ala	Ala	Val	Val	Ala	Ser	Ile	Asn	Pro	Gly	Gly	Thr	Ile	Tyr	530	535	540
Arg	Asn	Met	Ile	Val	Thr	Gln	Glu	Glu	Cys	Arg	Pro	Gly	Glu	Arg	Ala	545	550	555
Val	Ala	His	Gly	Arg	Glu	Arg	Thr	Asp	Ile	Leu	Glu	Ala	Lys	Phe	Val	565	570	575
Lys	Leu	Leu	Arg	Glu	Phe	Ala	Glu	Asn	Asn	Asp	Asn	Arg	Ala	Pro	Ala	580	585	590
His	Ile	Val	Val	Tyr	Arg	Asp	Gly	Val	Ser	Asp	Ser	Glu	Met	Leu	Arg	595	600	605
Val	Ser	His	Asp	Glu	Leu	Arg	Ser	Leu	Lys	Ser	Glu	Val	Lys	Gln	Phe	610	615	620
Met	Ser	Glu	Arg	Asp	Gly	Glu	Asp	Pro	Glu	Pro	Lys	Tyr	Thr	Phe	Ile	625	630	635
Val	Ile	Gln	Lys	Arg	His	Asn	Thr	Arg	Leu	Leu	Arg	Arg	Met	Glu	Lys	645	650	655
Asp	Lys	Pro	Val	Val	Asn	Lys	Asp	Leu	Thr	Pro	Ala	Glu	Thr	Asp	Val	660	665	670
Ala	Val	Ala	Ala	Val	Lys	Gln	Trp	Glu	Glu	Asp	Met	Lys	Glu	Ser	Lys	675	680	685
Glu	Thr	Gly	Ile	Val	Asn	Pro	Ser	Ser	Gly	Thr	Thr	Val	Asp	Lys	Leu	690	695	700
Ile	Val	Ser	Lys	Tyr	Lys	Phe	Asp	Phe	Phe	Leu	Ala	Ser	His	His	Gly	705	710	715
Val	Leu	Gly	Thr	Ser	Arg	Pro	Gly	His	Tyr	Thr	Val	Met	Tyr	Asp	Asp	720		

				725					730					735			
Lys	Gly	Met	Ser	Gln	Asp	Glu	Val	Tyr	Lys	Met	Thr	Tyr	Gly	Leu	Ala		
			740					745					750				
Phe	Leu	Ser	Ala	Arg	Cys	Arg	Lys	Pro	Ile	Ser	Leu	Pro	Val	Pro	Val		
		755					760					765					
His	Tyr	Ala	His	Leu	Ser	Cys	Glu	Lys	Ala	Lys	Glu	Leu	Tyr	Arg	Thr		
	770					775					780						
Tyr	Lys	Glu	His	Tyr	Ile	Gly	Asp	Tyr	Ala	Gln	Pro	Arg	Thr	Arg	His		
	785				790					795					800		
Glu	Met	Glu	His	Phe	Leu	Gln	Thr	Asn	Val	Lys	Tyr	Pro	Gly	Met	Ser		
				805					810					815			
Phe	Ala																

<210> 14  
 <211> 63  
 <212> PRT  
 <213> Caenorhabditis elegans

Trp	Val	Gly	Lys	Leu	Gln	Phe	Lys	Ser	Gln	Lys	Ser	Lys	Leu	Gln	Ala		
	1			5					10					15			
Asp	Ile	Tyr	Glu	Asp	Ser	Lys	Asn	Glu	Arg	Thr	Glu	Phe	Thr	Leu	Val		
			20					25					30				
Ile	Cys	Thr	Met	Cys	Asn	Gln	Lys	Thr	Arg	Gly	Ile	Thr	Ser	Lys	Gln		
		35					40					45					
Lys	Asp	Ala	Lys	Asn	Leu	Ala	Ala	Trp	Leu	Met	Trp	Lys	Ala	Leu			
	50					55					60						